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Note.—The application for a Patent has become void.

This print shows the Specification as it became open to public Inspection on June 22, 1935, under Section 91 (4) (a) of the Patents and Designs Acts, 1907 to 1932.

PATENT SPECIFICATION

454311

Application Date: Dec. 21, 1934. {*No. 36725/34.* *No. 36726/34.*

(One Complete Specification Left under Section 91 (2) of the Acts)

Specification not Accepted

COMPLETE SPECIFICATION

Improvements in the Manufacture of Cycle, Motor-Cycle or like Frames

We, PAUL RENÉ DE PARMENTIER, of 17, Place Xavier Neujean, Liége, and PAUL HENRI DE WILDE, of 15, Boulevard Militaire, Ghent, both in Belgium, both Subjects of the King of the Belgians, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention comprises an improved process for the manufacture of cycle, motor cycle and like frames, and means for the carrying out of the process. In this process, the tubes and stays forming a cycle or like frame are placed in a fixture which includes a number of dies. By die-casting, the bracket or lugs are cast direct on to the ends of said tubes or stays, thus ensuring their assembly, suitable metal or alloy being used.

Hitherto, in the assembly of the tubes forming a cycle or motor cycle frame or the like, there have normally been used connecting members such as bottom brackets, seat lugs, fork crowns, and top and bottom head lugs, made of malleable iron or sheet metal.

In the manufacturing process forming the subject of the present invention, there are utilized known materials which had not been considered up to the present, with this aim in view, particularly die-cast brackets, lugs and the like, made of bronze, brass or aluminium alloys. Thus, these connecting members, produced in a practically finished state, would save labour, would have a better appearance and, in the case of light alloys, would be considerably lighter than the usual malleable iron parts.

The said connecting members made of bronze or brass, could be brazed to the frame tubes, or these tubes could be placed in a fixture or jig, forming a casting die for the pressure or ordinary die-casting of the selected material, in a practically finished form, directly upon the tube ends, thus ensuring their assembly.

Pressure die-casting would be preferably resorted to, but for certain conditions of production, or when otherwise justified by the choice of alloy, ordinary die-casting gives complete satisfaction and its application would be more general for current production and easily flowing metals, and when the initial cost of pressure die-casting equipment is deemed prohibitive.

Thus for instance, the bottom tube, the seat pillar and if desired the rear forks or chain stays, could be placed and maintained in a jig forming a die for the bottom bracket. In this die could be cast the selected metal, ensuring the proper assembly of the tubes.

A similar fixture could be devised for the simultaneous or non-simultaneous die-casting of the seat pillar lugs. Top and bottom steering head lugs could be formed in the same way. However, these are customarily made of sheet steel which could eventually be brazed to the tubes or electrically welded thereto. Die-casting would enable fancy designs to be used.

The alloys specially considered are different alloys of aluminium, brass, bronze, zinc or magnesium (for example those known under the registered Trade Marks alpax, duralumin and monel metal, or aluminium bronze and the like). This process could be resorted to when aluminium-alloy tubes are used.

This invention is further exemplified in the following description of the manufacture of a cycle frame, with reference to

[*Price* 1/-]

the accompanying drawings, in which:—

Fig. 1 represents a set of frame tubes disposed in a jig for the simultaneous die-casting of the bottom bracket and seat pillar lug.

Figs. 2, 2^1, 2^{11}, 2^{111}, and 2^{1111} represent in section different forms of the front fork crown.

Fig. 3 represents schematically a vertical type of machine which can be used in the process.

Figs. 4 and 4^1 represent schematically horizontal types of machines showing the principles which could be applied in the manufacture of cycle frames and the like, following this process.

Fig. 5 represents schematically a cross view of an element of machine in which one half of the die is associated with the plunger type of metal-forcing injector.

Fig. 6 represents a cross sectional view of a bottom bracket obtained by die-casting of the selected metal directly upon the frame tubes.

Figs. 7, 7^1, 7^{11} and 7^{111} represent different kinds of anchorages with which the tube ends can be provided in the region covered with metal in the die-casting process.

Fig. 8 represents another kind of anchorage of built-up type.

Referring to these figures, and particularly to Fig. 1, 1 indicates the bottom tube; 2 indicates the seat pillar, 3 and 4 indicate the chain stays and rear forks, and 5 indicates the top tube. These tubes are shown in Fig. 1 held in the dies 15 and butted down against stops 16, whereon they are fixed. In this way, the parts of the die, such as 15, reassembled, will form the mould for the die-casting of bottom bracket 10 and seat lug 11.

The dies shown in Fig. 1 are combined for the simultaneous casting of bottom bracket 10 and seat pillar lug 11, but these operations could be performed separately.

Bottom tube 1 and top frame tube 5 (in case of a gentlemen's cycle) are generally assembled to the steering head tube 6 by means of pressed sheet steel lugs brazed or electrically welded. It is obvious that the complete frame assembly, including that of the front tube 6, could be performed in the same casting operation.

For the front fork assembly, a similar process is resorted to. Combined jigs and dies are used for the casting of the crown the reinforced threaded steel tube 7 (see Fig. 2) is inserted in the die and is embedded in the molten metal. The front fork stays or blades are assembled in a further operation to the fork crown ends by brazing as customary.

In a slightly different way, according to Fig. 2^1 and 2^{11}, the reinforced threaded tube 7 and the stays 9, are all inserted in the die, and the fork crown 8 is produced by casting.

Fig. 2^{111} and 2^{1111} represent other types of fork crowns.

Fig. 2^{111} shows a crown 8 with fork blades 9 embedded in the metal. These blades are fitted with a stop plate 12 which can be welded in order to prevent any molten metal flowing inside the blades, during the casting operation.

Fig. 2^{1111} shows another type of fitting similar in aim to Fig. 2^{111}, where a stop member 13 of flanged-conical shape is provided.

Thus this manufacturing process involves the use of a jig or fixture which receives the tubes or stays, the ends of said tubes or stays being inserted in dies which are parts of the fixture, and these dies forming moulds for the casting of the connecting members. The die-casting operation may produce a partial or a complete frame assembly.

Different types of machines could be evolved.

Fig. 3 shows schematically a vertical type of machine, in general built along the lines of an hydraulic press; under the working table 14, which carries the jigs and dies, is disposed any numbers of metal-forcing injectors 17, of known general type, communicating with said dies 15.

The machine schematically shown in Fig. 4 is in general built like a moulding press, as used in foundries. Under the fixed table 14, supporting the jigs and part of the dies 15, are placed the metal-forcing injectors communicating with said dies 15.

Fig. 4^1 shows a section of an injector associated with the under half of a die 15. In this machine, piston 18 comes into a recess 19 in die 15, so that the automatic or non-automatic opening of the die allows the easy withdrawal of the cast piece with the metal which has cooled in the gate or communicating chamber. For its introduction, the molten metal is poured into an opening 20. Several combined dies, like this one, controlled by a common system of valves, and disposed for instance as in Fig. 4, could form a machine allowing for the easy change-over from one type of cycle frame to another.

Fig. 5 represents a pressure die-casting unit, composed of a body or framework 21, carrying a vertical cylinder 22 with a piston 23, and a horizontal cylinder with a piston 25. In the base of this unit there is fitted the under-half of a die 15. Piston 23 carries the upper half 15^1 of the die, properly guided. Piston 23 effects

the closing of the die and maintains the pressure during the casting operation. Through opening 20 there is poured a given quantity of molten metal, in front of the injecting piston 18 operated by the hydraulic piston 25.

A system of valves could insure the proper automaticity of the different movements. For instance, closing of the die, rearward movement of the piston 18, stopping of the piston to allow for the pouring of metal, then injection of metal into the die, opening of the die, and extraction of the cast lug.

A number of units as per Fig. 5, renders possible a combined machine, easily adjustable, with a common table supporting the frame tube holding jigs.

Replacement of half dies 15 and 15^1 would permit different types of frames to be assembled, at minimum cost. As an example, one unit would be assigned to the bottom bracket die-casting, another to the seat-lug, still another to top and bottom head lugs.

Fig. 6 shows as an example a bottom bracket obtained by direct die-casting on the bottom tube 1, seat pillar 2 and rear stays 3. It will be noted that these tubes carry at their ends a sheet-iron cover 26, closing the tube in order to block the tube, to simplify the die and to facilitate and accelerate the demoulding operation.

This invention also, eventually, provides the tube ends in contact with the metal with anchorage fittings, the purpose of which is to reinforce the final assembly. Such anchorages are shown in Fig. 7 at 27, in Fig. 7^1 at 28, in Fig. 7^{11} at 29 and in Fig. 7^{111} at 30; they can be formed by mandrels, in a press, in a die or in a punching machine, or again they can be built up with special pieces 31, electrically welded for instance, upon the tube, as shown in Fig. 8.

The frame tubes such as 1, 2, 3, 4 and 5, could be made of one of the lighter alloys, such as duralumin, or any other metal.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

(1) Process for the manufacture of cycle, motorcycle or like frames, characterized by the use for all or any of the assembling members, such as bottom bracket, seat lug, top and bottom head lugs and fork crown, of metals or alloys other than malleable iron, such as aluminium, zinc, magnesium or bronze alloys, die-cast directly on to the ends of tubes and or stays forming the frame or the fork, the die-casting being accomplished under pressure or not.

(2) Process for the manufacture of cycle, motorcycle or like frames, according to claim 1, characterized by the use of tubes made of light alloys, the assembly of said tubes being obtained by the die-casting of connecting lugs and brackets with a suitable alloy, this die-casting being accomplished under pressure or not.

(3) Process for the manufacture of cycle, motor-cycle or like frames according to claims 1 and 2, characterized by the fact that the tubes and/or stays to be assembled are previously prepared and fixed in a suitable jig or fixture, said fixture including the appropriate dies or moulds, the assembling members such as the bottom bracket and/or lugs being die-cast directly in these moulds, on to the said tube or stay ends, this die-casting being accomplished under pressure or not.

(4) Process for the manufacture of cycle, motorcycle or like frames, according to claims 1, 2 and 3, by die-casting of the assembling members, such as bottom bracket and lugs, directly on to the tubes or stays forming said frame, characterized by the fact that said tubes or stays are blocked, for instance by means of a small pressed steel cover, the purpose of said cover being to prevent any molten metal from flowing into the tubes or stays, in order to simplify the lay-out of the die, reduce the tool cost and accelerate production.

(5) Process for the manufacture of cycle, motorcycle or like frames, according to claims 1, 2, 3 and 4, by die-casting of the assembling members, such as bottom bracket and lugs directly on to the tube ends of said frame, characterized by the fact that these tube ends are provided with anchorage fittings, in order to strengthen and reinforce the assembly.

(6) Means for carrying out the process according to claims 1, 2 and 5, comprising vertical or horizontal types of machines, similar to a press or to a moulding machine, characterized by a fixed table carrying the jigs or fixtures and the underpart of the dies, suitable metal-injecting mechanisms communicating with said dies.

(7) Means for carrying out the process according to claim 4, consisting of a metal injecting mechanism associated with part of a casting-die, the injecting piston at the end of its movement coming out into a recess in the die, the aim of said recess being to allow the easy extraction of the cast lug with the cooled mass of metal attached, when the die is opened, automatically or not.

(8) Means for carrying out the process according to claims 4 and 5, consisting of

a machine composed of an injecting piston, a pressure piston and a die, the die being opened or closed by the manœuvre of a system of valves, which ensures full or partial automaticity in the sequence of operations.

(9) Process for the manufacture of cycle, motorcycle or like frames according to claims 1 to 5, substantially as described.

(10) Means for carrying out the process of claims 1, 2, 3, 4, 5 or 9, comprising machines, fixtures or assembling units, according to claims 6, 7 or 8, substantially as described with reference to the accompanying drawings.

Dated the 21st day of December, 1934.

For the Applicants,
FEENY & FEENY,
Chartered Patent Agents,
73a, Queen Victoria Street,
London, E.C.4.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1936.

Fig.1.

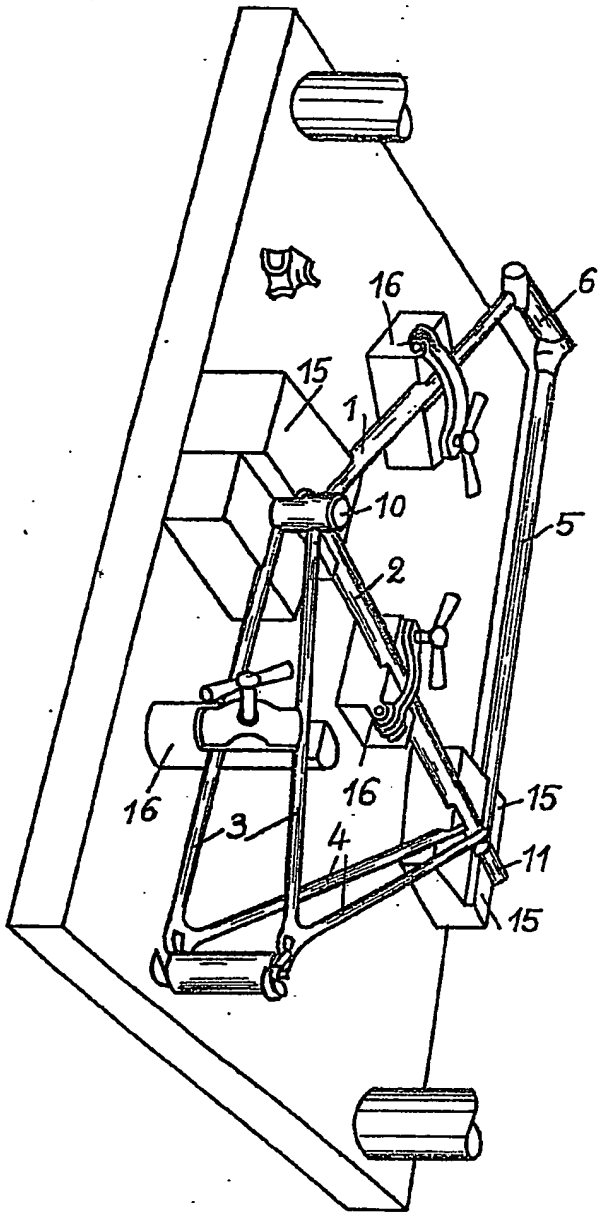
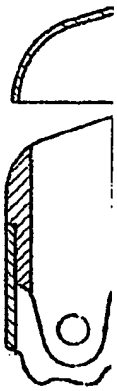


Fig.2



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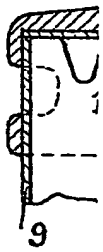

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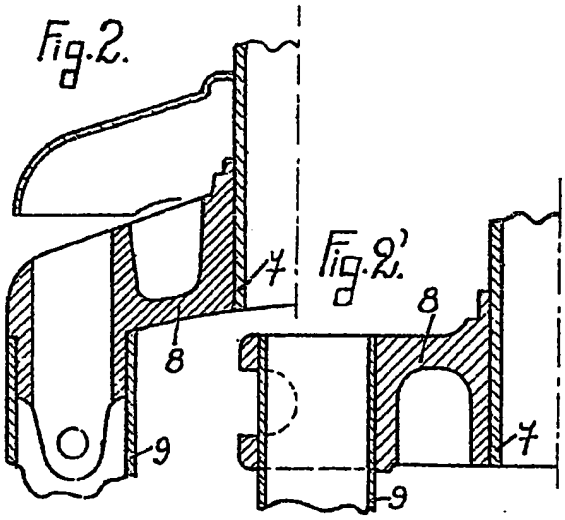

Fig.2'.

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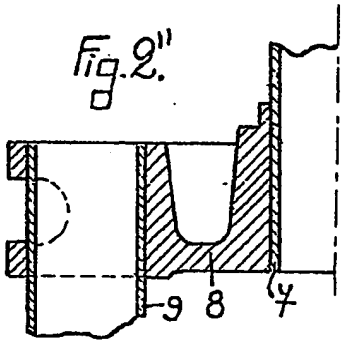

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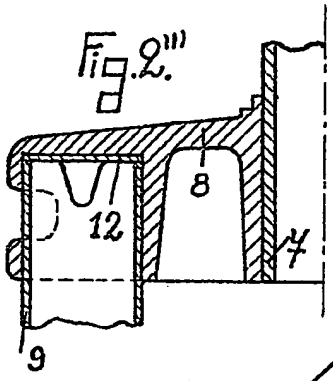

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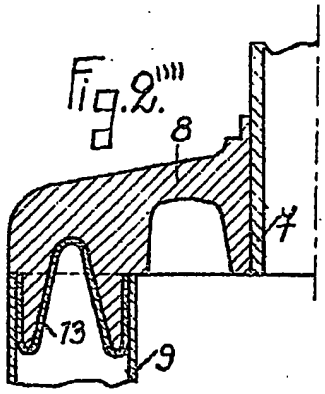
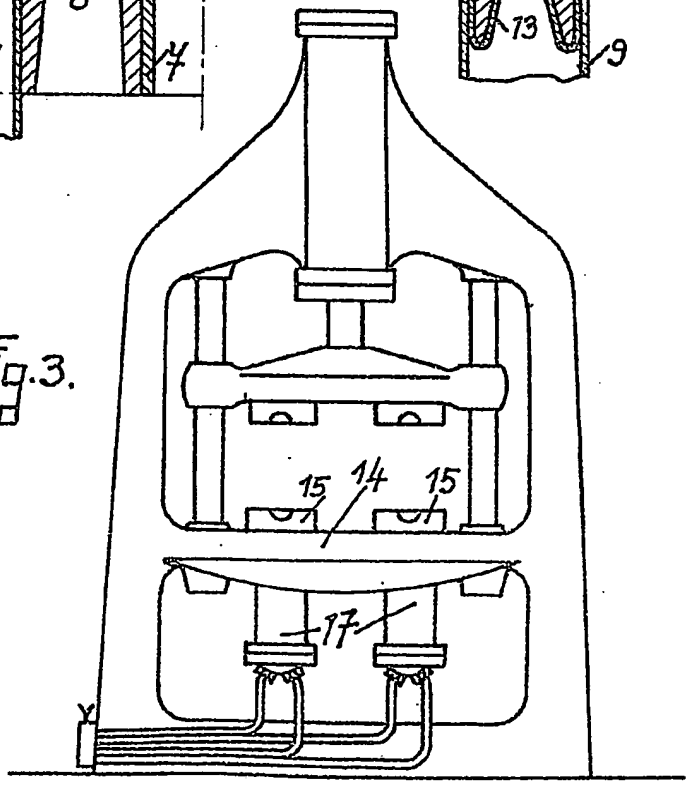


Fig.3.



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454,311 COMPLETE SPECIFICATION

4 SHEETS

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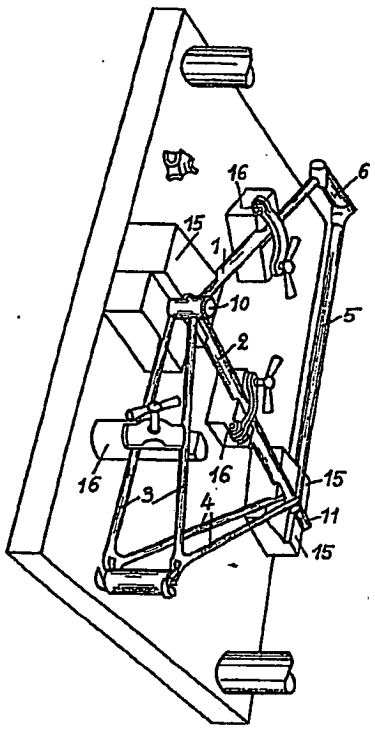

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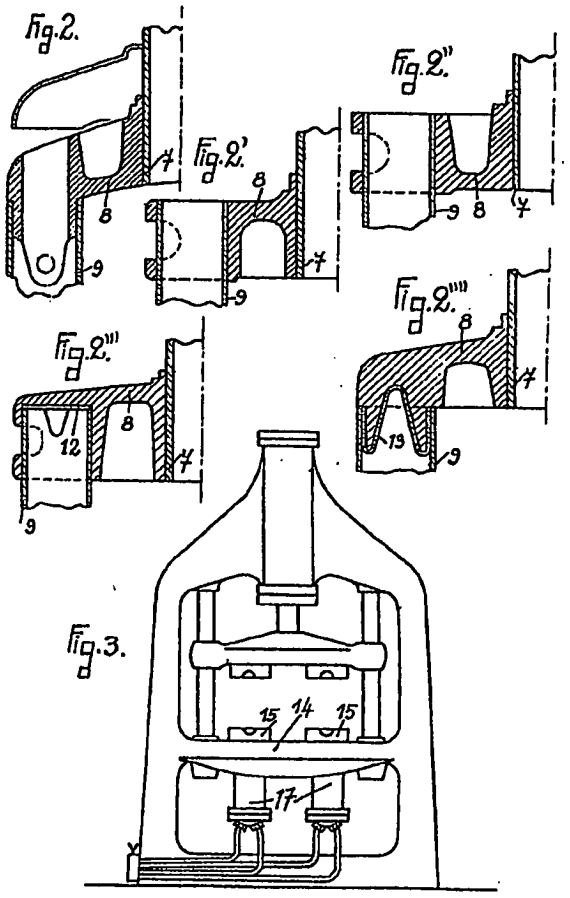

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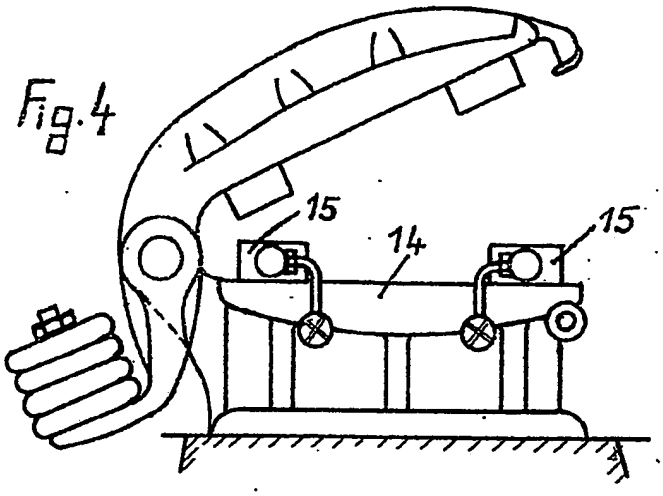
Fig.4



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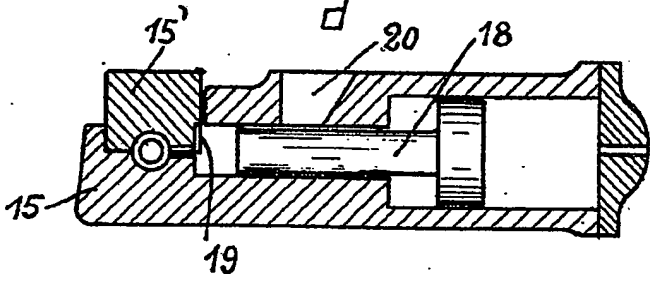


Fig.5.

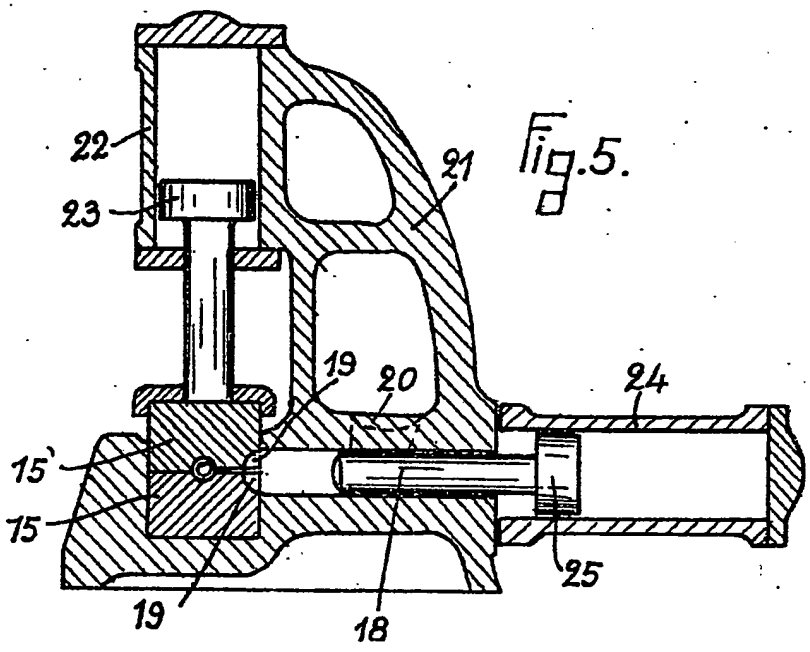


Fig.

Fig.4'

Fig.6.

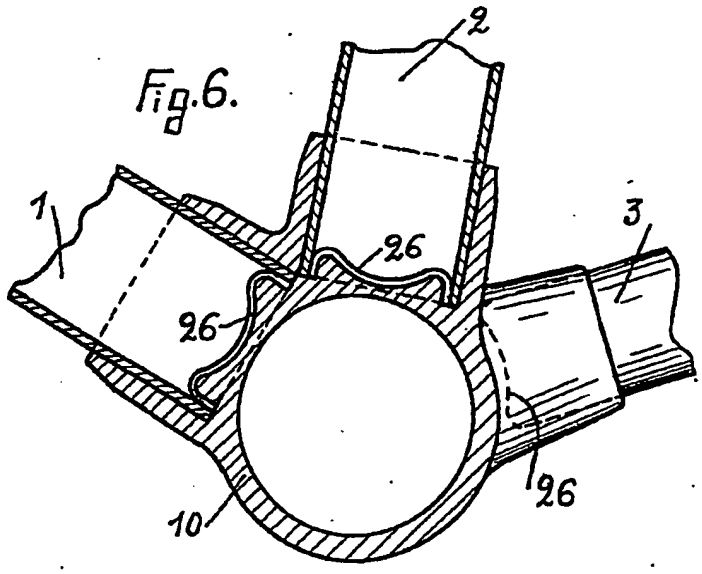
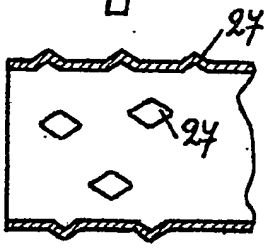


Fig.7.



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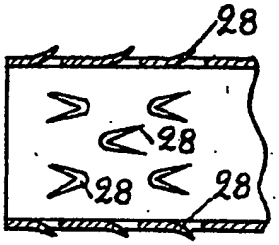

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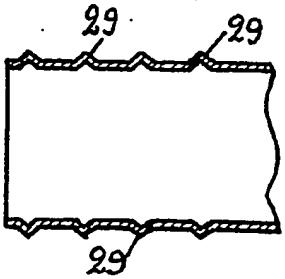

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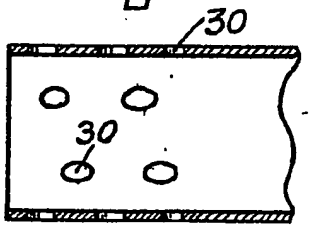

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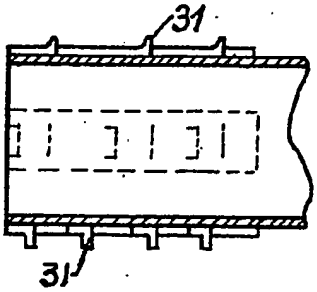

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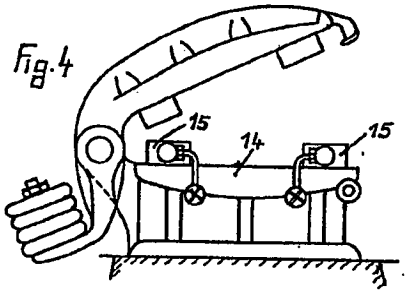
Fig.4



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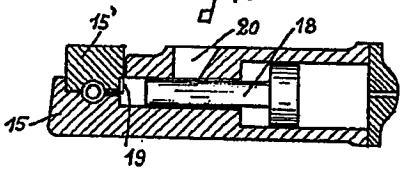

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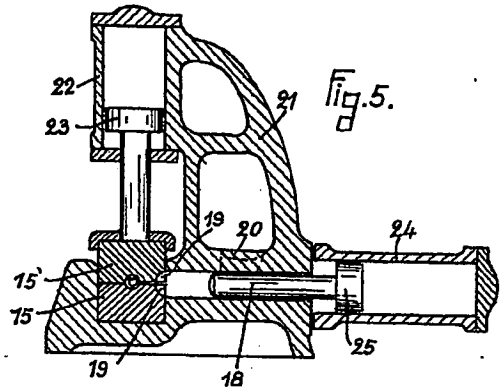

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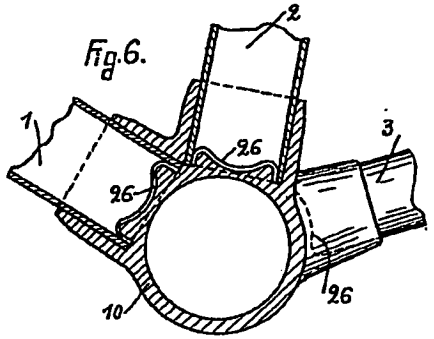

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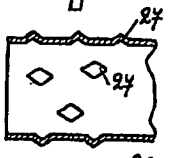

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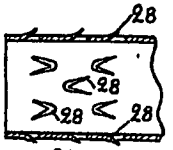

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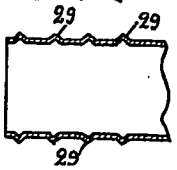

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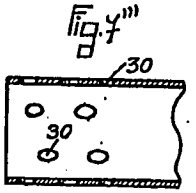

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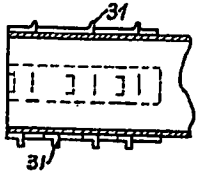

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